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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,186	11/05/2001	Yasushi Kohno	TKA0032	5700

7590 07/17/2009
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EXAMINER

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ART UNIT	PAPER NUMBER
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3643

MAIL DATE	DELIVERY MODE
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07/17/2009

PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YASUSHI KOHNO,
Appellant

Appeal 2009-003985
Application 10/007,186¹
Technology Center 3600

Decided:² July 17, 2009

Before CAROL A. SPIEGEL, ERIC GRIMES, and
JEFFREY N. FREDMAN, *Administrative Patent Judges*.

SPIEGEL, *Administrative Patent Judge*.

DECISION ON APPEAL

I. Statement of the Case

Appellant appeals under 35 U.S.C. § 134 from an Examiner's final rejection of all pending claims, claims 1, 4, and 5. We have jurisdiction under 35 U.S.C. § 134. We REVERSE.

¹ Application 10/007,186 ("the 186 application" or "Spec.") was filed 5 November 2001. The real party in interest is AGRITECNO YAZAKI CO., LTD. (Brief on Appeal filed 4 June 2008 ("App. Br.") at 2).

² The two month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

The subject matter on appeal is directed to methods of preventing defective germination and/or rosette formation of a plant seed by hydroconditioning the seed at 0°C to 15°C in a dark place, then drying the seeds. Claim 4 is illustrative and reads (App. Br. 14-15):

4. A method of preventing defective germination and rosette formation of a plant seed which tends to suffer from defective germination and rosette formation during growth thereof comprising the steps of:

a) leaving the plant seed to stand in a highly watery condition at a low temperature in a dark place for a period of time of from several days to several months to inhibit defective germination and rosette formation of the plant seed, the dark place being sufficiently dark to prevent the plant seed from germinating; and

b) drying the plant seed in a dark place, before the seed becomes active, being sufficiently dark to prevent the plant [sic, plant] seed from germinating, said drying takes place immediately after leaving the plant seed to stand in the highly watery condition at the low temperature in a dark place,

wherein in the step a) of leaving the plant seed in a highly watery condition the plant seed is exposed to an environment having a relative humidity of about 100% and a temperature of from 0 °C to 15 °C.

Claim 1 parallels claim 4 but specifies that the "highly watery condition" is immersion in water. Claim 5 also specifies that the "highly watery condition" is immersion in water, but only refers to preventing rosette formation.

The Examiner has rejected claims 1, 4, and 5 as unpatentable under 35 U.S.C. § 103(a) over Ohkawa³ in view of Coolbear⁴ and Khan⁵ (Ans.⁶ 3-5).

II. Findings of Fact ("FF")

The following findings of fact are supported by a preponderance of the evidence of record.

A. The 186 application

- [1] The 186 application describes hydroconditioning plant seeds which tend to suffer from defective germination or rosette formation, such as *Eustoma russellianum* seeds, seed starches, and sweet pea seeds, by immersing the seeds in water or maintaining them at approximately 100% relative humidity at 0°C to 15°C in a place sufficiently dark that the seeds do not germinate, usually for several days to several months (Spec. 3, ¶4, to 4, ¶4).
- [2] Since wet seeds are hard to handle, the hydroconditioned seeds are subsequently dried using conventional means, such as exposure to dry, ventilated air (Spec. 4, ¶5, to 5, ¶4).

B. Ohkawa

- [3] Ohkawa hypothesized that "temperatures during seed ripening . . . influence[d] rosette formation based on the observation that

³ Ohkawa et al., "Influence of Temperature Prior to Seed Ripening and at Germination on Rosette Formation and Bolting of *Eustoma Grandiflorum*," 53 *Scientia Horticulturae* 225-30 (1993) ("Ohkawa").

⁴ Coolbear et al., "An Evaluation of the Potential of Low Temperature Pre-sowing Treatments of Tomato Seeds as a Means of Improving Germination Performance," 110 *Ann. app. Biol.* 185-94 (1987) ("Coolbear").

⁵ US Patent 5,294,593, *Inducing Dormancy in Non-Dormant Seeds*, issued 15 March 1994 to Anwar A. Khan ("Khan").

⁶ Examiner's Answer mailed 16 July 2008 ("Ans.").

- temperatures during seed hydration influence the low temperature treatment response" (Ohkawa 226, ¶2).
- [4] Ohkawa tested his hypothesis with two experiments (Ohkawa 226, ¶¶3-4).
- [5] In Experiment 1, seeds of *Eustoma grandiflorum* were germinated and grown until flower buds were visible and then transferred to natural light phytotrons set at 33/28, 28/23 or 23/18° C day/night temperature. Seeds were then harvested from the plants and in turn sown and grown under the same lighting and temperature conditions. Water was supplied by subirrigation for 5 weeks after sowing, followed by overhead irrigation. Eight weeks after seed hydration, the number of seedlings which had bolted were counted. [Ohkawa 226, ¶3.]
- [6] In Experiment 2, "[s]eeds ...were hydrated at 28/23°C for up to 3 days and then stored at 3 or 10° C for 5 weeks. These treatments were given under continuous irradiance ... [then] seedlings were transferred into a 33/28 or 28/23°C (day/night) phytotron. At that time, control seeds were sown and also maintained at 33/28 or 28/23°C (day/night)." [Ohkawa 226, ¶4.]
- [7] Ohkawa reported that

[r]osette formation and subsequent bolting of *Eustoma grandiflorum* are influenced by temperature conditions prior to seed ripening and after germination has commenced. Rosette formation was decreased if parent plants were matured at 23/18°C (day/night) temperature and was increased at 33/28°C. Further low temperature seed treatment of hydrated seeds at 3°C or 10°C for 5 weeks decreased rosette formation and enhanced subsequent seedling bolting. [Ohkawa abstract.]

C. Coolbear

- [8] Coolbear evaluated the potential of low temperature pre-sowing treatments ("LTPST") of tomato seeds comprising allowing the seeds to imbibe distilled water, while being kept continually moist, in the dark, i.e., in lidded boxes, at 10°C on germination performance (Coolbear abstract; 186, ¶4).
- [9] Low temperatures prevent seeds from germinating (Coolbear 186, ¶3).
- [10] At 10°C, Moneymaker tomato seeds exhibited a very low germination rate of about 1% after 21 days (Coolbear 187, ¶6; 188, Figure 1).
- [11] According to Coolbear, LTPST of tomato seeds, at least, is of limited economic potential and agronomical effects (Coolbear 193, ¶¶2-3).
- [12] However, Coolbear concluded that further investigation into the use of LTPST to improve uniformity of germination or to prevent or repair damage when seeds are stored under less than optimal conditions is needed (Coolbear 193, ¶3).

D. Khan

- [13] Khan discloses a method of inducing dormancy in nondormant seeds which require gibberellin synthesis for germination, comprising (a) soaking the nondormant seeds in an aqueous solution of a gibberellin synthesis inhibitor, such as tetcyclacis, preferably in the dark at 25°C to 35°C, for at least 24 hours, (b) washing to remove the inhibitor, and (c) drying to the original seed weight (Khan abstract; 3:1-49).
- [14] According to Khan, one method of releasing the induced dormancy comprises chilling the dormant seeds, preferably at 5°C, with moisture present for 4 to 40 days, preferably in the dark (Khan 4:13-20).

E. Definition

[15] Vernalization is the "induction in plants of the competence or ripeness to flower by the influence of cold, that is, at temperatures below the optimal temperature for growth" (McGraw-Hill⁷ 1713).

III. Discussion

A. The Examiner's findings and conclusions

The Examiner found that Coolbear teaches essentially the same methods claimed but for (i) treating the seeds for period of time ranging from several days to several months and (ii) drying the treated seeds in the dark (Ans. 4 and 7). According to the Examiner, the method of Coolbear is equivalent to "vernification" and, therefore, prevents defective germination and inherently prevents rosette formation to some degree (Ans. 5).

Further according to the Examiner, Ohkawa provides evidence of general knowledge in the art of keeping hydrated seeds at 3°-10° C for 5 weeks, i.e., from several days to several months (Ans. 8). The Examiner also found that Ohkawa teaches essentially the same method as claimed but for teaching that the plant seed undergoes drying after immersion in water and that the immersion and drying are conducted in a dark place (Ans. 4).

The Examiner found that Khan teaches that it is known to chill seeds in water at 2°C-10°C from 4 to 40 days, including in the dark (Ans. 7-8) and that it is conventional wisdom to dry seeds in the dark to prevent loss of dormancy, thereby allowing the seeds to be stored for several months (Ans. 5).

⁷ McGraw-Hill Dictionary of Scientific and Technical Terms (2d ed. 1978).

The Examiner found that it is general knowledge in the art that light and darkness have effects on germination (Ans. 5).

The Examiner concluded that it would have been obvious to treat and store seeds that germinate in response to light in the dark in order to prevent premature germination as taught by Ohkawa and Coolbear (Ans. 5). The Examiner also concluded that it would have been obvious to dry seeds and to store them in the dark to prevent a loss of dormancy and to permit storage for several months as taught by Khan (Ans. 5). According to the Examiner, the claimed steps are merely a combination of old and notoriously well-known measures in the art of plant husbandry known to yield predictable results (Ans. 8).

B. Appellant's arguments

Appellant argues that Ohkawa is primarily directed to subjecting plants, not seeds, to low temperature treatments after germination but before seed ripening (App. Br. 7). Appellant further argues that the hydrated seeds referred to in Ohkawa's abstract correspond to the hydrated seeds of Ohkawa Experiment 2 (App. Br. 7-8; Reply Br.⁸ 2). Therefore, according to Appellant, Ohkawa does not teach the claimed steps of (i) leaving the plant seed to stand in a highly watery condition at a low temperature (ii) in a dark place, (iii) for a period of time of from several days to several months, and (iv) drying the seeds immediately after leaving the seeds stand in the highly watery condition (App. Br. 8; Reply Br. 2). Further according to Appellant, Ohkawa does not teach or suggest hydrating seeds for 3 days in a "highly watery condition" as claimed or storing the hydrated seeds in the dark (App. Br. 9 and 11; Reply Br. 2).

⁸ Reply Brief filed 16 September 2008 ("Reply Br.").

In addition to the deficiencies in Coolbear noted by the Examiner, Appellant contends that Coolbear is silent on the relationship, if any, between LTPST and rosette formation and/or defective germination (App. Br. 9).

Appellant argues that soaking seeds in the gibberellin synthesis inhibitor solution of Khan does not correspond to step a) of the claimed methods and that the intervening wash step in Khan precludes the drying step of Khan from corresponding to step b) of the claimed methods (App. Br. 10-11).

Finally, Appellant argues that Ohkawa does not support the Examiner's position that the method steps of Coolbear and Khan inherently prevent rosette formation because Coolbear and/or Khan fail to teach or suggest the claimed method steps (Reply Br. 2-4).

C. Issue

At issue is whether Appellant has shown that the Examiner erred in failing to identify a reason that would have prompted one of ordinary skill in the art combine the teachings of the applied prior art references as claimed.

D. Legal principles

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of

the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). In *KSR*, the Supreme Court reaffirmed principles based on its precedent that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416. The Court emphasized that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

"Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set circumstance is not sufficient." *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981) (quoting *Hansgirk v. Kemmer*, 102 F.2d 212, 214 (CCPA 1939)).

E. Analysis

According to the 186 specification, *Eustoma russellianum* seeds are among the plant seeds which tend to suffer from defective germination or rosette formation (FF 1). Ohkawa studied the effect of temperature after germination but before seed ripening on rosette formation and bolting of another *Eustoma* flowering plant, *Eustoma grandiflorum* (FF 3-7). Experiment 2 of Ohkawa described hydrating seeds at 28/23° C (day/night) for up to 3 days and then storing the seeds at 3 or 10° C for 5 weeks, both under continuous irradiance (FF 6). Ohkawa did not define, and the Examiner did not find that, "hydrating" a seed requires soaking it in water or

maintaining it in a 100% relative humidity environment. Notably, Ohkawa hydrated the seeds at a temperature from 23° to 28° C, not at a temperature of 0° to 15° C as claimed. Moreover, Ohkawa not only failed to disclose treating and storing seeds in the dark as claimed, but rather expressly described the opposite, i.e., treating and storing seeds in the light (under continuous irradiance) (FF 6). The Examiner relies on Coolbear and Khan to remedy the deficiencies of Ohkawa.

Coolbear studied the effect of low temperature pre-sowing treatments of tomato seeds on germination performance, which treatments included allowing the seeds to imbibe water at 10°C while being kept in the dark (FF 8). The Examiner equated the method of Coolbear with vernalization and, by extension, with prevention of defective germination (Ans. 5). In addition, according to the Examiner, preventing defective germination inherently prevents rosette formation to some degree (Ans. 5). However, the Examiner did not explain or support these statements. For example, the Examiner did not explain how defective germination necessarily, not "to some extent," prevents rosette formation. Furthermore, Coolbear suggested that its LTPST treatment may produce uniformity of germination (FF 12). The plain language of "uniformity of germination" suggests that the seeds germinate at the same time, not that the germination *per se* is defective. In addition, the Examiner did not explain why one of ordinary skill in the art would have combined the teachings of Ohkawa and Coolbear, especially in view of Coolbear's teaching that LTPST of tomato seeds, at least, is of limited economic potential and agronomical effects (FF 11). "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in

the prior art to deprecate the claimed invention.” *In re Fine*, 837 F.2d 1071, 1075 (Fed. Cir. 1988).

The Examiner relied on Khan to show the conventionality of drying and storing seeds in the dark to prevent a loss of dormancy (Ans. 5). However, step b) of the claimed invention not only requires drying the seeds in the dark, but also drying the seeds immediately after hydrating the seeds by immersion in water or by exposure to an environment having a relative humidity of about 100%. Khan teaches the former limitation of step b), but not the latter (FF 13). Moreover, Khan is silent regarding defective germination and rosette formation.

Thus, we find that the Examiner has failed to provide either an adequate factual basis or to explain the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of the claimed invention to combine the teachings of Ohkawa, Coolbear, and Khan. Thus, we infer that the Examiner selected these references with the assistance of hindsight. *Accord In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998). "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *Fine*, 837 F.2d at 1075.

F. Conclusion

Appellant has shown that the Examiner erred in failing to identify a reason that would have prompted one of ordinary skill in the art combine the teachings of the applied prior art references as claimed.

Therefore, based on the foregoing, we reverse the rejection of claims 1, 4, and 5 under § 103 over the combined teachings of Ohkawa, Coolbear, and Khan.

Appeal 2009-003985
Application 10/007,186

IV. Order

Upon consideration of the record, and for the reasons given, it is
ORDERED that the decision of the Examiner rejecting claims 1, 4,
and 5 as unpatentable under 35 U.S.C. § 103(a) over Ohkawa in view of
Coolbear and Khan is REVERSED.

REVERSED

saw

cc:

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